Pre-pregnancy Obesity and Associated Risks of Adverse Pregnancy Outcomes: Findings from a Population-Based Survey

Chao S M, MPH, PhD, Chandra Higgins, MPH
Los Angeles County Department of Public Health Maternal, Child, and Adolescent Health Programs

County of Los Angeles Public Health
Maternal, Child & Adolescent Health Programs

LAMB
LOS ANGELES MOMMY & BABY PROJECT

Background

- In the United States, more than one-third of women are obese and 8% of reproductive-aged women are extremely obese.[1]
- Pre-pregnancy obesity is a well-documented risk factor for obstetric complications.

Objective

- To determine the association between obesity and the likelihood of various pregnancy complications among women of Los Angeles County.

Methodology

- Design: Cross-sectional
- Population: Women who delivered in LA County in 2012
- Source: 2012 Los Angeles Mommy and Baby (LAMB) project survey data, a population-based mail sample survey with telephone follow-up for non-respondents. LAMB utilized a multistage and clustered sampling design.[2]
- Independent variables: self-reported height and weight prior to pregnancy
- Dependent variables: preeclampsia, gestational diabetes, placenta previa, macrosomia, cesarean delivery, breastfeeding initiation, and breastfeeding for 3 months

Statistical Analysis

- Bivariate analysis was performed to calculate prevalence of pregnancy outcomes by BMI prior to pregnancy.
- Multiple logistic regression was used to model the association between pre-pregnancy BMI and pregnancy complications.
- Covariates in the final model were selected based on literature review.
- Sampling weights were used to adjust for complex study design and non-respondent rates.
- Final model adjusted for: maternal age, education level, ethnicity, medical insurance before pregnancy, marital status, weight gain, parity, and complicated obstetric history (previous miscarriage, elective abortion, or stillbirth).
- Statistical Analysis System Version 9.2 was used to perform the analysis.

Study Population

- N= 5,586 (adjusted response rate = 63%)
- Singleton mothers
- 14% Asian/Pacific Islander, 8% Black, 59% Latina, 19% White
- Maternal age: 7% less than 20 years, 43% 20-34 years, 50% greater than 55 years
- In LA County, 18.6% of women were obese before pregnancy
- Obesity rates by ethnicity
  - Asian/Pacific Islander: 1 in 6
  - Black: 1 in 3
  - Latina: 1 in 4
  - White: 1 in 6

Results

Table A. Pregnancy Outcomes by Weight Categories: Bivariate Analysis

	Normal (BMI 15 - 25)		Overweight (BMI 25 - 29.9)		Obese (BMI >= 30)	
(N)	(3147)		(1379)		(1060)	
	%		%		%	
Preclampsia	7.50	6.56 - 8.40	12.30	10.52 - 13.99	21.50	19.04 - 24.01
Gestational diabetes	8.20	7.24 - 9.16	11.20	9.51 - 12.85	17.60	15.31 - 19.92
Placenta previa	4.50	3.73 - 5.18	5.10	3.95 - 6.29	5.10	3.73 - 6.38
Cesarean delivery	30.40	28.83 - 32.05	37.30	34.79 - 39.90	49.50	46.52 - 52.54
Macrosomia	5.80	4.94 - 6.57	8.00	6.61 - 9.49	10.20	8.37 - 12.01
No breastfeeding initiation	93.20	92.35 - 94.11	89.70	88.04 - 91.27	88.00	86.04 - 89.99
Breastfeeding less than 3 months	67.10	65.39 - 68.79	56.70	54.00 - 59.40	51.20	48.10 - 54.33

Table B. Pregnancy Outcomes by Weight Categories: Multiple Logistic Regression Analysis

	Overweight (BMI 25 - 29.9)		Obese (BMI >= 30)	
Outcomes	Odds Ratio	95% CI	Odds Ratio	95% CI
Preclampsia	1.60	1.15 - 2.21 *	2.75	2.01 - 3.76 **
Gestational diabetes	1.90	1.37 - 2.63 *	2.46	1.76 - 3.44 **
Placenta previa	1.18	0.79 - 1.77	1.05	0.66 - 1.68
Cesarean delivery	1.28	1.04 - 1.58 *	1.94	1.52 - 2.47 **
Macrosomia	1.13	0.77 - 1.66	1.41	0.96 - 2.07
No breastfeeding initiation	1.65	1.56 - 1.74 *	1.60	1.51 - 1.69 **
No Breastfeeding less than 3 months	1.56	1.51 - 1.61 *	1.58	1.53 - 1.64 **

Discussion

- Higher pre-pregnancy BMI is associated with increased odds of developing adverse pregnancy outcomes (Table B), after controlling for confounders.
  - Overweight women were more likely than normal weight women to have preclampsia, gestational diabetes, or cesarean delivery.
  - Overweight women were less likely to initiate and continue breastfeeding.
  - Obese women were at even greater risk than overweight women for the same variables.
- No difference was found in the likelihood of placenta previa or macrosomia between overweight/obese women and normal weight women.
- Given the numerous medical consequences of pregnancy in overweight and obese women, all attempts should be made to prevent obesity in women of child-bearing age and to encourage weight loss before pregnancy.
- There is a need for public health initiatives to help women of reproductive age learn strategies to maintain healthy body weight. The currently available programs in LA County to prevent and treat maternal obesity are limited and would benefit from further development.
- Due to the retrospective nature of the survey there is potential for recall bias in the responses. There may be unmeasured confounders and/or effect modifiers that were not considered. The results from this study are generalizable to LA County.

1. http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Obesity-in-Pregnancy

2. The 2012 LAMB project was made possible by First 5 LA and MCAH general grants. For further information about LAMB, please visit http://publichealth.lacounty.gov/mch/lamb/LAMB.html, call (213) 639-6400 or email Shin Chao (schao@ph.lacounty.gov).